

LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

1 (currently amended): A method of improvement of toughness of a heat affected zone in a welded joint of a steel plate, wherein said steel plate has a plate thickness t , characterized by subjecting a surface of a heat affected zone formed by a last pass of a multi-layer welded joint of a steel plate to impacts by an ultrasonic vibration tool ~~or shot peening by ultrasonic vibration steel balls~~ using one or more pins having a diameter of 5 to 30 mm with an oscillating amplitude of between 20 to 60 μm to thereby make an average of longitudinal axis of crystal grains at a depth of at least 2 mm from the surface of the steel plate in the microstructure adjacent to a fusion line (FL) of a weld metal and a steel plate matrix in said heat affected zone formed by the last pass equivalent to the crystal grain size of the steel plate matrix before the welding at a depth of $1/4$ of the thickness t from the surface of the steel plate.

2 (currently amended): A method of improvement of toughness of a heat affected zone in a welded joint of a steel plate, wherein said steel plate has a plate thickness t , characterized by subjecting a vicinity of a toe portion of a fillet welded joint of a steel plate to impacts by an ultrasonic vibration tool ~~or shot peening by ultrasonic vibration steel balls~~ using one or more pins having a diameter of 5 to 30 mm with an oscillating amplitude of between 20 to 60 μm to thereby make an average of longitudinal axis of crystal grains at a depth of at least 2 mm from the surface of the steel plate in the microstructure adjacent to a fusion line of a weld metal and a steel plate matrix in the heat affected zone in the vicinity of the toe portion equivalent to the crystal grain size of the steel plate matrix before the welding at a depth of $1/4$ of a thickness t from the surface of the steel plate.

3 (presently presented): A method of improvement of toughness of a heat affected zone in a welded joint of a steel plate as set forth in claim 1 or 2, characterized in that the average of longitudinal axis of crystal grains at the depth of at least 2 mm from the surface of the steel plate is 30 μm or less.

Claim 4: (canceled).

5 (currently amended): A method of improvement of toughness of a heat affected zone in a welded joint of a steel material as set forth in ~~any one of claims 1, 2 or 4~~ claim 1 or 2, characterized by supplemental heating said steel plate before or during the impacts by the ultrasonic vibration tool ~~or the shot peening by the ultrasonic vibration steel balls~~.